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Hungarian Zoological Researches In Korea, Mongolia and South-East Asia

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This is a presentation done by Dr. S. Mahunka who is a Deputy Director-General of the Hungarian Natural History Museum in Budapest. He was invited by Korea Science and Engineering Foundation (KOSEF) and participated in a special seminar as an invited speaker which was organized by the Center for Insect Systematics in Kangweon National University, Chuncheon, Korea.

Ladies and gentlemen,

In 1970, exactly twenty years ago, I stepped on first time on the land of your country. True enough, it was not the Republic of Korea, but somewhat north to the dividing line where I touched ground. Ever since my and my colleagues' connections with Korea was friendly and understanding inspite of the fact that Hungary, this very small country, located in the middle of Europe, seems to be a distant land to you, to view her from here appears to be away at the back of beyond!

Before coming to the topic of my lecture, please allow me to forward officially the best greetings of the hungarian zoologists to you. We all hope here in Hungary, that my visit to your republic will be followed by mutual visits of Korean and Hungarian scientist, first of all zoologists, to our countries which will be fruitful for both of us. We seem to lose ties with the socialist Korea but I am sure our connections with you compensate for this loss.

The topic of my lecture is the series of researches carried out by Hungarian experts in Korea, Mongolia and South-East Asia.

Over the past 18 years we completed 12 expeditions to the People's Republic of Korea, or as is shortly termed North Korea. The preparation of the animals have been done continuously and we have now several hundred thousands of well-prepared specimens. The scientific elaboration of the material has been the task of a large team of Hungarian and foreign experts. The number of written contributions has just reached on number of one hundred, in them almost 500 new species were described covering a wide range of animals from the worms to the vertebrates. Of course, this is a very brief summary to show you what Hungarian zoologists in collaboration with a few foreign experts have completed in connection with the North Korean fauna.

Earlier I made reference to my country being very far from yours, obviously you might stage the question how could we and why we had done such an impressive work. In the subsequent part of my lecture I try to give you a few answers, but before I embark on these, let me give you - in order for

better understanding our work completed in Korea - a few introductory sentences on our problems of zoology.

I am convinced that our branch of science, i.e. zoology, but more especially its backbone taxonomy complemented with zoogeography and faunistics, so identification work, cannot be cultivated in a small plot of land, cannot be studied independently from its neighbouring territories. Hungary is an excellent example to illustrate this, since the political borders just do not coincide with the natural or zoogeographical boundaries. Thus we Hungarians wish to explore more than what naturally given to us, this is, how shall I put it, a kind of drive we always had in us.

In the beginning of the 19th century, the time when modern zoology made a spectacular development in Hungary, we made our first steps in this direction. We never colonized lands, never overpowered other nations, they just do not fit into our way of thinking. But one thing is sure, we have a passion for collecting things, to enrich the collections of our national museums, and there is that drive, a drive which compels us to produce something better than average. Our first collecting activity was concentrated on Europe, mostly the surrounding countries, later the Balkan Peninsula, which was followed in the middle of the 19th century into Asia Minor, and somewhat later into North Africa. Around the turning of the century we proceeded into two directions: the heart of Black Africa, just think of the Sámuel Teleki expedition, the centennial anniversary of which we celebrate in these days, or of Kálmán Kittenberger, the hunter and collector in East Africa. The other direction was Asia and the Far East. Outstanding expedition leaders were János Xantus and Lajos Bir who visited India and New Guinea, or the expeditions of count Zichy to the Caucasus, Mongolia and China.

Following the great political and economic upheavals brought about by the wars, right after the second world war, new collecting expeditions were organized. These may be characterized by a feverish rush, which basically obviously aimed at collecting zoological and other natural historical items, but lying drive was the liberation in travelling. Many of you also surely know what it means not to see your northern relatives, what a life is in "socialist democracy", whence it is difficult to travel abroad, or when it is allowed there must be "special" reasons. Fortunately, we could convince the high official that expeditions are such "special reasons". At other occasions we had our trips organized by the UNESCO or the FAO, who mostly also paid our expenses. This is for example how I could participate in two expeditions lasting for 10 months to South America. Other opportunities were offered within the bilateral interstate agreements of two "fraternal socialist countries". Agreements signed by two such academies were frequently useful for making zoological collecting. Several collecting trips were thus organized to Mongolia, N. Korea and Vietnam.

So we arrivd to the answer of the second question of "why N. Korea"?

1. To cultivate zoology it is more than advisable to study the fauna of the entire Palaearctic Region
2. Owing to science historical reasons we are more attached to Asia than to any other continent
3. N. Korea offered excellent opportunities, distant enough, yet easily accessible

Of course, I could list some other reasons, like specialists from capitallistic countries were not particularly invited. From the point of view of zoology, Korean Fauna is very interesting, strongly influenced by the Oriental Region.

What is studied in a scientific institute or what is collected in an expedition, in our country is usually decided, or at least coordinated by the director or the leader of the institute or museum.

In the case of Mongolia it was the director-general, Dr. Zolt n Kaszab, a world widely famous Tenebrionid specialist, who visited that country six times between 1963 and 1968, which was an excellent hunting ground for him since he was much interested in the fauna of arid zones. Dr. Kaszab led six expeditions to Mongolia, brought back a huge amount of valuable material.

Since I know that you are more interested in the fauna of Korea, herewith I give you only a summary of the Mongolian results. In the elaboration of the material not only Hungarian but also foreign experts participated. I show you the main results in a projector. (**Table 1**)

Table 1. Results of the zoological expeditions to Mongolia

Number of publications	456(6700pages)
Number of contributors	180
Number of new genera described	71
Number of new species described	1,692
Number of identified species	11,000

On the other hand, since I am a soil zoologist, I concentrate my attention on mites, consequently, I am an ardent lover of forests and especially of rain forests. So when I was appointed director of the Zoological Department of the Hungarian Natural History Museum, I obviously tried to avert the attention from the arid territories rather to forested areas, as are Korea and Vietnam. With this statement now we arrived to our next question: how was the work organized and carried out?

The collecting expeditions peculiarly had a bilateral nature. On the one hand, we organized our tours according to ideal conitions, on the other, the states of affair were quite different, in other words, in reality Korea was something different. We observed a kind of "alertness", which did not stem from the individual wish of the accompanying Korean colleagues, save one or two, most were very friendly and we feel deep gratitude to them all. So under such pressing conditions they helped us all the way.

Our original idea was to explore the entire fauna of North Korea, this, of course, was a very naive conception. We wanted to collect from the seashore to the tops of mountains, and if possible, in all seasons, in order to gain a cross-section of the fauna. Since the bird fauna is fairly well known, nor did we want to bother much with mammals, protozoans and sponges.

For this reason, we always sent at least two experts for a period of 4 to 6 weeks. Another thing we always stressed, and so to say expected from everyone, that they had to collect almost all groups of animals. The specialists were selected so as to cover as many different groups of animals as they could. Since we were aware of the fact, that any specialist on the field is bound to collect mostly his special group, or at least tend to.

Here I confess we just could not fulfil our principal aim, that is, to explore the entire fauna of

North Korea, nevetheless, our results are remarkable. As you might know, quite some time was taken up by compulsory visits to various cultural programmes, the memorial places, like the birthplace of Kim Il Sung. The published itinaries clearly reflect the number of days spent on these events.

Still the 18 years, during which we completed 12 expeditions, brought some imposing results. Let us see now the specialists and the groups in which they are interested. (**Table 2**)

Table 2. Collecting trips of the Hungarian Natural History Museum to Korea (1970–1988)

I. trip:1970	(S. Mahunka	and	H. Steinmann)
	Acari		Orthoptera
II. trip:1971	(J. Papp	and	S. Horvatovich)
	Hymenoptera		Coleoptera
III. trip:1972	(J. Papp	and	A. Vojnits)
	Hymenoptera		Lepidoptera
IV. trip:1977	(O. Gy. Dely	and	A. Dely–Draskovits)
	Reptilia		Diptera
V. trip:1978	(A. Vojnits	and	L. Zombori)
	Lepidoptera		Hymenoptera
VI. trip:1979	(H. Steinmann	and	T. Vásárhelyi)
	Dermaptera		Heteroptera
VII. trip:1980	(L. Torrő	and	GY. Topál)
	Crustacea		Mammalia
VIII. trip:1982	(L. Forrő	and	L. Ronkay)
	Crustacea		Lepidoptera
IX. trip:1985	(A.VOjnits	and	L. Zombori)
	Lepidoptera		Hymenoptera
X. trip:1986	(G.Csorba	and	A. Demeter)
	Mammalia		Mammalia
XI. trip:1987	(Z. Korsős	and	L. Ronkay)
	Diplopoda		Lepidoptera
XII. trip:1988	(O. Merkl	and	GY. Szél)
	Coleoptera		Coleoptera

Subsequently, I give you a brief account of the methods of collectings, since they might give you some idea what animal groups are covered the most. To simplify things I make reference to habitats (soil, water, vegetation, other) rather than to animal groups.

SOIL: Barber and pitfall traps. They were used with some preserving fluid (ethylene-glycol, saline water) or without it, then some baiting material (beer, putrifying meat, fruit), occasionally both were used in combined form (e.g. saline water and beer). I must remarks here that the traps were placed

out, as a rule, for short periods of time, since at one place we usually stopped only for a few days. Obviously, much longer time lapse would have been needed to have larger catches. Sprinkling formaline on the soil (weak concentrations only). Collecting soil samples does not only mean soil, but also humus, litter, roots, mouldering vegetable matter, moss, lichen and clod. Some of which were fixed at the collecting site, other were taken back to camp and picked or extracted by Berlese funnels. The fixing method is good for studying Nematodes and Tardigrada, while the latter for the less active animal groups. Sifting humus, litter and mouldering remains, also picking single specimens or/ and extracting in the Moczarsky-Winkler apparatus. These later peculiarly enough proved to be better for mites than was the Berlese funnel. Turning over stones, washing bank, tredding were mostly effective on water banks or on soggy grounds.

WATER: Plankton sample and fixed at the collecting site, netting in the water, picked water plants were washed.

VEGETATION: The use of sweeping net for all kinds of fast moving insects (Diptera, Hymenoptera, Odonata), beating the vegetation onto a white sheet, peeling off barks, picking hiding arthropods.

OTHER METHODS: Malaise-trap, it is a tent-like trap with four partition walls which functions automatically (mostly for flying insects, like flies and Hymenoptera), yellow colour-trap filled with some kind of liquid in which the attracted animals drown. Trapping small mammals (mouse-trap), nets for birds and bats. The use of lamp after sunset was a highly effective methods for collecting many insect groups attracted by light. During the last expeditions we had the opportunity to collect in distant places late in the night, for we were allowed to use a Honda generator. Formerly, lamping could be carried out in the vicinity of a power supply, i.e. close to a hotel or a rest-house with electricity. The most important collecting sites are shown on the subsequent map. I did not spare time in indicating collecting routes, for they were not real collecting routes. Usually we travelled to distant places on trains and as a rule in the nights. Occasionally we had, where good roads allowed, taken a jeep and at some resting places we rushed out to make some collectings nearby.

Inspite of these inconveniences we were lucky in most of our trips, since extensive collectings had been carried out in the two zoogeographically most important ranges:

1. The high mountainous area of North Korea, first of our in the environs of Samjiyon, including the mountain Paekdu-san, which is a highly important region being transitional between the East Siberian taiga and the vegetation of the Korean Peninsula.

2. The mountainous area of Kumgang-san in the south-eastern part of North Korea, where a strong influence of the Oriental Region was felt. This stages the question whether the entire fauna of Korea really belongs to the Palaearctic Region, or not? Besides these two large, important areas, we visited a large number of other localities both inland and along the eastern and western shores: Kaesung, Nampo, Haeju, Woensan.

Finally we came to discuss the results of our expeditions. I must confess I am in an awkward situation, since the elaboration of a big part of our material has just started, we made only the first steps. For example, the material of the last expeditions has just recently been prepared. The scientific evaluation of such important groups like the butterflies and moths (only two families have been more

thoroughly studied) or the beetles (only a few families have been tackled) have been partly identified. The prepared material of some groups has been sent to collaborators not employed in the museum (like Annelida, Nematoda), Tardigrada, and now, we have no results.

When I drew up the draft of this lecture I asked several colleagues for information concerning the number of specimens, the number of identified specimens, the number of new species and subspecies, how many articles have been written on the Korean fauna, etc. This is shown here. (**Table 3**)

Table 3. Results of the zoological expeditions to N. Korea

Number of publicatuons	103(1100pages)
Number of contributors	71
Number of new genera described	25
Number of new species described	500
Number of identified species	3,000

I compiled a list of the newly described species broken down to animal groups. (**Table 4**)

Table 4. New species and subspecies from North−Korea

Taxa	number	Taxa	numbea
Annelida	1	Trichoptera	3
Tardigrada	2	Lepidoptera	5
Pauropoda	1	Coleoptera	300
Diplopoda	3	Diptera	12
Protura	1	Hymenoptera	110
Plecoptera	6	Acari	61

These numbers speak for themselves, and I must state that we are content with the results reached so far. If we can keep up the interest of the foreign experts and arouse the interest of further specialists, then I might venture to declare that the fauna in the Northern part of your country, will be among the better known countries' in East-Asia. Unfortunately, your northern brothers are left out of such elaborations, since they do not seem to be interested in such type of taxonomic, faunistic research, or they haven't such opportunities. Our taxonomic results are impressive. Today somebody should not describe a new species, let alone a new taxon, without making some kind of revisionary work. On the other hand, the time was not yet enough for making zoogeographic and fauna genetic synthesis. But I am sure time will come when such works can be done. One of my colleagues, *Dr. Jeno Papp* working on Hymenoptera has drawn my attention to some important points of interest:

1. The elaboration of the Hymenoptera material brought out some striking results. Out of the now

known 834 species 572 (68.5%) are new to the fauna of Korea. This one sentence clearly demontrates the state of affairs in the study of Hymenoptera. Out of this number 110 species and subspecies are new to science, this suggests that there is still much to be done in the eastern parts of the Palaearctic Region. Evaluating the Hymenoptera from a zoogeographical aspect, it became clear that most species represent Palaearctic elements, mostly in the Paekdu-san and broad environs, while in the Kumgang-san region a lot of oriental elements were observed.

2. The specific composition of the Hymenoptera fauna of the People's Republic of Korea is related in the broad sense of the word with the West Palaearctic species. At the same time, there are several species which are directly connected, as far as Braconidae are concerned, with the Nearctic fauna region.

3. However, there are many species which are distributed all over the Holarctic Region., these are mostly common species.

4. From among the Oriental colouring elements the followings are interesting. (**Table 5**)

Table 5. Colouring elements from the Oriental Region

Eulophidae	:
	Stenomesius japonicus (Ashmead)
Pteromalidae	:
	Trichomalopsis apanteloctena (Crawford)
Braconidae	:
	Apanteles argiope Nixon
	Dolichogenidea conopiae (Watanabe)
	Diolcogaster electes (Nixon)
	Nyereria forensis (Tobias)
	Phanerotomella bellula Papp
Sphecidae	:
	Liris japonica (Kohl)
	Psen exaratus (Eversmann)
	Tachytes fruticis Tsuneki
	Tachytes modestus Smith
Formicoidea	:
	Brachyponera chinensis (Emery)
	Ponera japonica Wheeler
	Pristomyrmex pungens Mayr

5. So far there is only one endemic Korean species: *Cerceris hokkanzana* Tsuneki (Specidae)

6. Interestingly enough the composition of the Bombus fauna of Japan was decisively influenced by the Bombus species of the Korean Peninsula, Mandsuria and some other Far Eastern Palaearctic elements. It seems obvious that during the glaciation of the W rm (20-30 thousand years ago) the

Riss (same 170 thousand years ago) epoch these lands were bigger owing to low water level, thus, the various species of Bombus could stand a better chance of flying over from one territory to another, i.e. to Japan.

7. The unexplored condition of the large group of Hymenoptera is well illustrated by the newly described species of Sphecidae and Vespoidea, groups which are comparatively well known throughout the world.

I could list you similar results from some other groups or my special field too, from the mites of Tarsonemina and Oribatida orders. Since the mite fauna of Korea has been entirely unexplored. Some 200 identified species are known, 61 are new to science, still there is much to be done, and these numbers must be considered only as partiraseal results. Furthermore, the influence of the Oriental Region is so strong in my special mite group, that I dare not to call them Palaearctic in origin. These disjointed, or fragmentary data to which I made reference somehow show what has been and what will have to be done. I should cordially like to ask your cooperation and help in studying and elaborating our material deriving from North Korea, and this is how the exploration of the entire fauna of the whole Korean Peninsula will be possible.

As I mentioned, Vietnam is the third country, which I should like to talk about. Our results in this line are really only preliminary. Although the first zoologists from Hungary visited this country in the 1950s, the real regular collecting and elaboration of the materials began in 1986. So far only 5 expeditions have been completed. Similarly to the scientific elaboration of the Korean materials, here too we organized besides the Hungarian specialists also foreign experts. The number of publications is now 16, but in which already several new species were described.

Besides these three Asian countries where we began extensive faunistic and taxonomic research, Hungarian zoologists also carry out taxonomic investigations from India to Sumatra and from Singapore to the Philippines. Furthermore, and I must say, we are proud of this land, we are requested to undertake or cooperate in purposeful research work too. Please allow me to tell you a short account of such a project.

A few years ago the Bukit Timah Rain Forest Reserve of Singapore came into the focus of interest due to the expansion of agricultural lands, when, in fact, its territorial integrity was endangered. This reserve was a part of heated debates questioning whether it is justified to establish and manage such a small isolated nature conservation area. Apparently most of the specialists think that it would be better to have extensive nature conservation areas. They reject the establishment and management of small ones.

I have a different opinion and to support my view here is the folliwng facts.

The total area of the Bukit Timah Nature Reserve is only 71 hectares; its vegetation principally comprises original lowland evergreen tropical rain forest. The Oribatid fauna of this area is very rich. During the preliminary survey of the material I have established the presence of some 150 Oribatid species. This number is very high, especially if we compare it with number of species listed by Hammer from different countries /e.g. Fiji 83, Java 123, Bali 84 species. The following points are also interest:

1. Almost all the Oribatid genera which are characteristic for rain forests from South-East Asia,

e.g. Heterobelba, Leobodes, Oxyamerus, Idiozetes, Yoshiobodes, Allozetes, Nixozetes.

2. Several species known only from Sumatra were also discovered in these samples.

3. The number of underscribed species is very high, especially in the superfamilies Otocepheoidea, Oppioidea and Galumnoidea, where species usually have very restricted distributional areas.

These data unequivocally prove that the soil mite fauna of the territory unalterably preserves, with great probability, its original diversity, and if the flora and the vegetation do not drastically suffer changes, this mite fauna will be able to preserve it natural genetic stock!

In several respects we came to the same conclusion in connection with our investigations in the national parks of Hungary. In various animal groups, as Lepidoptera and Mammalia, special methods of investigations, e.g. marking-recapture, were employed by which the size of the population and the internal movements could be calculated.

Definite conclusions were reached with respect to mammals and birds: they cannot preserve diversity at any small-sized area, on the other hand, the majority of arthropodan groups suffice even with small territories comprising a few hectars only. These extensive investigations came to the conclusion that if any change nevertheless occured in the fauna it was due in all cases to change of a basic factor, e.g. decrease in soil water level. Therefore if we accept that not only the genetic stock of large mammals and birds should be strictly protected, we must approve the creation of small nature resueves, like that of Bukit Timah! Thank you.

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